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STATISTICAL INDICATORS FOR EVALUATING AND MONITORING  
THE REPRESENTATION OF WOMEN AND MINORITIES IN THE  
AGENCY FOR INTERNATIONAL DEVELOPMENT

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EXECUTIVE SUMMARY

Evaluating the effects of affirmative action programs continues to be a problem since the passage of the 1964 Civil Rights Act. The lack of standard measure of performance acceptable to both employers and regulatory agencies is recognized as an important factor why full compliance on one hand, and effective enforcement of affirmative action program, on the other, is difficult to attain.

The objectives of this study are (1) to develop statistical indicators to evaluate the representation of women and minorities in the workforce over time, and (2) to demonstrate the use of this procedure to data obtained from the Agency for International Development (A.I.D.). A.I.D. is used as a case study because its performance in the hiring and promotion of women and minorities is under review by the Government Accounting Office (GAO).

The procedure involves the estimation of an ideal workforce distribution which was constructed from a discrete probability density function based on the gender ratio and racial composition of the national civilian labor force and the grade distribution of the Agency's workforce. The difference between the actual and the ideal workforce classified by race, gender and grade is used to develop three statistical indices, namely, (1) the Representation Index, (2) the Glass Ceiling Index, and (3) the Chi Square Value. The Representation Index shows that White

Males and Other Minority Males (Hispanics, Asians and American Indians) are over-represented in the Foreign Service but under-represented in the Civil Service. The over-representation of White Males and Other Minority Males is a constraint to recruitment and promotion of women and minorities in the Foreign Service. As a result, White Females are seriously under-represented across all grade levels in both the Civil Service and the Foreign Service. Black Males and Black Females are under-represented in the Foreign Service but over-represented in the Civil Service. Other Females are fully represented in the Foreign Service and over-represented in the Civil Service.

The Glass Ceiling Index shows that women and minorities are under-represented at the senior and executive level positions in both the Civil Service and Foreign Service. The exception are the Black Females who appear to have penetrated the glass ceiling in the Civil Service.

The Chi Square Values show that the difference between the actual and the ideal workforce has decreased significantly during the last five years for most racial and gender groups, except Black Females in the Civil Service. This trend is also confirmed by changes in the Representation Index and the Glass Ceiling Index. This implies that the A.I.D. workforce is slowly evolving towards a more proportional representation of women and minorities reflecting the gender and racial composition of the civilian labor force and A.I.D.'s grade distribution.

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STATISTICAL INDICATORS FOR EVALUATING AND MONITORING  
THE REPRESENTATION OF WOMEN AND MINORITIES<sup>1</sup> IN THE  
AGENCY FOR INTERNATIONAL DEVELOPMENT

Ernesto C. Lucas<sup>2</sup>

INTRODUCTION

When the 1964 Civil Rights Act was passed, discrimination against women and minorities in private and public employment was pervasive, causing sharp economic inequality. Income of Black households was only 60% of White households, and female workers earned only about 60% of the income of male workers.

Twenty-seven years later, discrimination continues to exist. While women have made limited progress, the economic situation of Blacks actually declined. For example, female labor participation rate jumped from 37% in 1965 to 60% in 1990 and the female/male earnings ratio jumped from 64% in 1980 to 72% in 1990. Female executives, however, continue to be paid only 64% of the wages of their male counterparts<sup>3</sup>.

African Americans, on the other hand did not do as well. For example, the Blacks/Whites median income ratio declined from 60% in 1970 to 58% in 1990. The unemployment rate has increased from 8.2% in 1972 to 11.3% in 1990, and the

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<sup>1</sup> To be presented at the 68th Annual Conference of the Western Economics Association International, July 6-9, 1992, San Francisco, California.

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<sup>3</sup> U.S. News and World Report, November 14, 1991

poverty rate has increased from 30% in 1970 to 32% in 1990.

Discrimination remains as pervasive and more subtle than before. The passage of the 1991 Civil Rights Act leaves unresolved and unclear the fundamental question of the civil rights obligations of employers in hiring and promotion. A Department of Labor study<sup>4</sup> found that while most employers truly believe that they are fulfilling their affirmative action obligations, the report found that they have no guidelines or standards to follow. The lack of guidance or a standard measure of compliance causes a great deal of uncertainty among employers. At the same time regulatory agencies are also uncertain regarding the extent to which compliance should be enforced.

The Agency for International Development (A.I.D.) was chosen as a case study because the data on workforce levels classified by race, gender and grade distribution were readily available from its "Multi-Year Affirmative Employment Program Plan for Minorities and Women, FY 1988 - FY 1992". Also, its affirmative action program is currently under review by the General Accounting Office.

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<sup>4</sup> Department of Labor, "Report on the Glass Ceiling Initiative", Washington D.C., May 1991.

### OBJECTIVES OF THE STUDY

The objectives of this study are (1) to develop a statistical procedure to evaluate the representation of women and minorities in the workforce, and (2) to validate the procedure by applying it to data obtained from the Agency for International Development.

### PROCEDURES

Three statistical indicators---the Representation Index (RI), the Glass Ceiling Index and the Chi Square Value (CSQ) are developed and used to evaluate the representation of women and minorities in the A.I.D. workforce. These three statistical indicators are estimated from the difference between the actual and the ideal workforce. The ideal workforce, in turn, is obtained from a discrete probability density function which is derived from the race and gender statistics of the national civilian labor force and the grade distribution of A.I.D.

Specifically, the procedure involves six steps as follows.

1. Construct a discrete probability density function based on the (a) national civilian labor force classified

by race and gender, and (b) A.I.D.'s workforce classified by grade.

2. Estimate A.I.D.'s ideal workforce by multiplying the probability density function estimated above by the actual workforce level.
3. Estimate the differences or deviations by subtracting the ideal from the actual workforce distribution.
4. Estimate the Representation Index (RI) by (a) dividing the algebraic sum of the differences obtained in (3) by the sum of the ideal workforce obtained in (2) times 100; or (b) dividing the sum of the actual by the sum of the ideal workforce across all grades minus 1.00.
5. Estimate the Glass Ceiling Index (GCI) by dividing the sum of the differences obtained in (3) across all the senior and executive grades and dividing it by the corresponding sum in the ideal workforce.
6. Estimate the Chi Square Value (CSQ) by dividing the sum of the squares of the differences by the sum of the ideal workforce.

A mathematical version of the above procedure is found in Annex II.

The above procedure has important practical and theoretical characteristics. First, the data requirements are not difficult to obtain. Agency workforce data, classified by race, gender and grade are regularly reported by each federal agency. The

national civilian labor force data, classified by race, gender and job category is published annually by the Bureau of Labor Statistics, Department of Labor. Second, the procedure can be used as a workforce planning model. All it requires is an estimate of a discrete probability density function based on the Agency projections of the workforce level classified by job category or the grade distribution. Projections of the gender ratio and racial composition of the labor force can be obtained from the Department of Labor. Third, the analysis can be used as a diagnostic tool to identify the degree of under or over representation of certain gender and racial groups at different grade levels and job categories. Such a diagnostic analysis is a necessary component of a workforce planning model.

The procedure has also important theoretical characteristics. It is based on probability theory and accepted statistical procedures. For example, the discrete probability density function from which the ideal workforce distribution is constructed is an established concept in probability theory. Index numbers are widely used in time series analysis to track the magnitude and direction of certain economic or social variables. Chi Square analysis is widely used in the social and biological sciences to test the goodness of fit of an actual against an ideal distribution.

## DATA

Two sets of data were used in this study. First is the national civilian labor force data classified by race and gender. This are shown in Table 1. Second is the A.I.D. Civil Service and Foreign Service workforce data classified by grade. These are shown in Table 2.

### TABLE 1

#### Civilian Labor Force Distribution by Race and Sex, 1986 and 1990

Gender/Race	Freq. Distbn in 1000		Percent Distribution	
	1986	1990	1986	1990
<u>Gender</u>				
Male	65422	68234	55.52	54.68
Female	52413	56554	44.48	45.32
Total	117835	124788	100.00	100.00
<u>Race</u>				
Whites	101801	107177	86.39	86.88
Blacks	12654	13493	10.74	10.81
Oth.Min. <sup>a</sup>	3380	4117	2.87	3.31
Total	117834	124787	100.00	100.00

<sup>a</sup> Obtained by subtracting Whites and Blacks from the Total.

Sources: Bureau of Labor Statistics, "Employment and Earnings", U.S. Dept. of Labor, Jan. 1991.

Bureau of Labor Statistics, Handbook of Labor Statistics, Bull. No. 2340, U.S. Dept. of Labor, August, 1991

TABLE 2

Agency for International Development Workforce  
Distribution by Grade, 1986 and 1990

Grade	1986	1990
<u>A. Civil Service</u>		
GS 1-4	2.33	6.97
GS 5-8	17.21	31.25
GS 9-12	21.84	24.77
GS 13-15	49.21	34.68
SES	9.41	2.33
Total	100.00	100.00
<u>B. Foreign Service</u>		
FS 6-9	3.40	2.36
FS 3-5	22.40	26.86
FS 1-2	59.60	55.80
SFS	14.60	14.18
Total	100.00	100.00

Source: Agency for International Development, "Multi-Year Affirmative Employment Program Plan for Minorities and Women, FY 1988 - FY1992."

### RESULTS

The Agency for International Development has long been involved in staff reduction, beginning from the end of the Vietnam War and continuing to the present time and perhaps through the 1990s. This has complicated the affirmative action program of A.I.D. aimed at increasing the number of women and minorities across all grade levels and providing them opportunities for advancement to senior and executive positions.

During the period 1986-1990, A.I.D. direct hire staff decreased by 1750 (34%), from 5161 in 1986 to 3411 in 1990. Of this reduction, 1577 (90.0%) were male and 173 (10.0%) were

female; 1671 (95.0%) were Civil Service and 79 (5.0%) were Foreign Service. Only female Foreign Service personnel has experienced an increase of 36 direct hire staff.

This reduction resulted in the structural improvement of the personnel system. For example, the "top heavy" structure of A.I.D. personnel was "normalized", especially for the Civil Service and to a lesser extent the Foreign Service. In 1986, the Civil Service senior and executive staff constituted 58.62%. This was reduced to 37.01% in 1990. Similarly, the senior and executive staff of the Foreign Service was reduced from 74.20% in 1986 to 69.98% in 1990.

It is against this background that progress in affirmative action during the last five years must be evaluated. The structural improvement in the personnel system has provided limited opportunities for women and minorities to compete for the limited senior and executive positions in the Agency.

The progress is reflected by the indicators discussed below. In interpreting the results, the decision rule is that if the Representation Index, the Glass Ceiling Index, and the Chi Square Values converge towards zero over time, it means that the actual workforce distribution, through affirmative action programs, shifts closer to the ideal workforce distribution. The goal of affirmative action program is to develop such personnel policies, practices, statutes and laws to make it possible for convergence of the RI, the GCI and the CSQ towards zero.

### 1. Representation Index

The Representation Index (RI) is obtained by dividing the algebraic sum of the difference between the actual and the ideal workforce by the sum of the ideal workforce and multiplying the quotient obtained by 100. It assumes either a positive, a negative or a zero value. A racial or gender group is over-represented ( $R > 0$ ) if the actual exceeds the ideal workforce level, under-represented ( $R < 0$ ) if the actual is less than the ideal workforce level, and fully represented ( $R = 0$ ) if the actual is equal to the ideal workforce level.

Table 3 summarizes the number and Index of Representation by racial and gender groups for Civil Service and Foreign Service in 1986 and 1990.

TABLE 3

Number and Index of Representation by Race and Gender,  
1986 and 1990

Race/Gender	Civil Service		Foreign Service	
	1986	1990	1986	1990
A. Number				
White Male	87	-378	420	360
Oth.Male	67	- 1	71	66
White Fem.	-588	-215	-430	-383
Black Male	5	20	-24	-16
Black Fem.	417	545	-32	-27
Oth.Fem.	11	26	-5	0
Total <sup>a</sup>	0	0	0	0
B. Index in Percent				
White Male	5.49	-49.15	47.19	42.96
Oth.Male	126.42	-3.45	244.82	200.00
White Fem.	-63.30	-33.36	-60.31	-55.16
Black Male	2.56	21.05	-21.02	-15.84
Black Fem.	269.92	672.83	-35.02	-33.53
Oth.Female	26.19	104.00	-21.73	0.00

<sup>a</sup>, The sum may not add to zero due to rounding errors.

#### A. Civil Service

As shown in Table 3, only the White Females were under-represented by 588 (63.30%) in 1986. All the other racial and gender groups were over-represented especially Black Females which were over-represented by 417 (269.92%); White Males by 87 (5.49%) and Other Male Minorities by 67 (126.42). Staff reduction in the Civil Service continued that by 1990, White Males were under-represented by 378 (-49.15%), and White Females were also under-represented by 215 (-33.36%). On the other hand, Black Females were over-represented by 545 (672.83%), Black Males by 20 (21.05%) and Other Females by 26 (104.0%).

## B. Foreign Service

The Foreign Service exhibits a different pattern. In 1986, White Males and Other Male Minorities were over-represented by 420 (47.19%) and 71 (244.82%) respectively. All the other racial and gender groups were under-represented, the White Females by 430 (-60.31%); Black Females, by 32 (-35.02%); Black Males, by 24 (-21.02%); and Other Females by 5 (-21.73%). In 1990, the pattern has not changed. White Males and Other Males continued to be over-represented while White Females, Black Males and Black Females continued to be under-represented. See Figures 1A-6B and Tables 1 - 6, Annex I.

## 2. The Glass Ceiling Index

The glass ceiling is defined as those "artificial barriers based on attitudinal or organizational bias that prevent qualified individuals from advancing upward in their organization into management level positions."<sup>5</sup> It is shown as under-representation of women and minorities in the senior and executive grade levels. It is obtained by dividing the sum of the difference between the actual and the ideal workforce of women and minorities in senior and executive positions (GS 13 - SES, FS 2 - SFS) by the corresponding sum of the ideal workforce, multiplied by 100.

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<sup>5</sup> United States Department of Labor, "Report on the Glass Ceiling Initiative", Washington D.C. May 1991.

It is often negative in value and the Glass Ceiling Index is expressed in percent.

See Table 4.

TABLE 4

Number and Index of Representation by Race and Gender Affected by the Glass Ceiling

Race/Gender	Civil Service		Foreign Service	
	1986	1990	1986	1990
A. Number				
White Male	476	22	424	350
Oth. Min.	60	10	56	44
White Fem.	-472	-44	-409	-345
Black Male	-18	-5	-14	-9
Black Fem.	-35	13	-46	-38
Oth.F.Min.	-11	0	-12	-6
Total <sup>a</sup>	0	0	0	0
B. Index in Percent				
White Male	51.23	7.67	64.14	59.12
Oth.M.Min	193.55	90.91	254.54	191.30
White Fem.	-65.44	-18.72	-77.17	-70.41
Black Male	-15.51	-13.89	-17.07	-70.41
Black Fem.	-37.63	43.30	-69.70	-65.52
Oth.F.Min.	-44.00	0.0	-70.58	-31.58

<sup>a</sup> Sum may not add to zero due to rounding errors.

#### Civil Service

Technically, White Males and Other Males in 1986 and 1990, and Black Females in the in 1990, are not constrained by the glass ceiling because they are not under-represented in the senior and executive positions. The over-representation of White Males and Other Males are included in Table 4 only to demonstrate that it represents a formidable ceiling or a barrier that limits the opportunities of women and minorities to advance in senior and executive positions.

Foreign Service

The Foreign Service exhibits a pattern similar to that of the Civil Service, i.e., under-representation of women and minorities in the senior and executive positions and over-representation of White Males and Other Minority Males. The only difference is that the under-representation of women and minorities is more severe in the Foreign Service than in the Civil Service.

Despite the problems noted above, efforts to address the glass ceiling have been fairly successful, particularly in the Civil Service and to a lesser extent the Foreign Service. For example, over-representation at the Senior and Executive level grades in the Civil Service for White Males and Other Males have been reduced substantially by 454 and 50 respectively, and in the Foreign Service by 74 and 12. Correspondingly, under-representation of women and Blacks in the senior and executive positions in the Civil Service and Foreign Service have also decreased.

There remains a number of real and formidable constraints in eliminating the glass ceiling. First is the slow rate of attrition of White Males and Other Males in senior and executive level positions. Second, there is a tendency to replace high level vacant positions with contract personnel or with experts under IPA, RSSA or PASA arrangements recruited from outside

of the Agency. Third the "top heavy" structure of the senior and executive grades in the Foreign Service requires further re-structuring that may call for elimination of some positions. This reduces the opportunity for women and minorities to be promoted to senior and high level position. See Figures 1A-6B, and Tables 1 - 6, Annex I.

### 3. The Chi Square Values

The third statistical indicator is the Chi Square Value (CSQ). It measures the "goodness of fit" of the actual relative to the ideal workforce distribution. It assumes a value of zero or positive; zero when the actual is equal to the ideal workforce distribution and positive when the actual deviates from the ideal distribution. The magnitude of the deviation is directly proportional to the value of the CSQ.

TABLE 5

Chi Square Values by Race and Gender,  
1986 and 1990

<u>Race</u>	<u>Civil Service</u>		<u>Foreign Service</u>	
	1986	1990	1986	1990
White Male	562.46	342.67	306.22	231.70
White Female	542.54	99.92	332.40	264.42
Black Male	9.51	29.34	5.95	4.18
Black Female	4222.59	6006.34	98.22	57.89
Other Males	146.54	17.78	194.42	154.97
Other Females	43.92	53.42	26.58	18.64

The goal of an affirmative action program is to bring the actual closer to the theoretical distribution over time. As the actual approaches the ideal distribution, their difference become smaller---converging to zero when a perfect fit is attained. At this point, the CSQ also converges to zero.

There are cases when it is practically imposible or prohibitively expensive to attain a perfect fit or a CSQ value equal to zero. In most instances, statisticians are satisfied even when a difference exists between the actual and the ideal workforce distribution so long as the difference is not considered significant in the statistical sense.

For the years 1986 and 1990, the result shows that the actual workforce distribution is significantly different from the theoretical. However, this difference has been reduced substantially over the five year period, 1986 to 1990.

#### 4. Summary of Changes in Workforce Distribution, 1986-1990

a. White Males: During the last five years, the number of White Males in the Civil Service has been significantly reduced from 1672 in 1986 to 391 in 1990. Of this reduction, 1096 (84%) represented a reduction in the senior and executive levels. This caused a 378 net under-representation which was concentrated in the junior and middle level grades. Despite this reduction, White Males remain over-represented at the senior and executive levels. On the other hand, White Males in the

Foreign Service continues to be over-represented by 360 in 1990, all of which are in the senior and executive levels. This over-representation presents a serious constraint to affirmative action program and other programs to overcome the glass ceiling within the Agency. See Figures IA and IB.

b. White Females: White Females continue to be seriously under-represented at all grade levels in both the Civil Service and Foreign Service. In 1986 they were under-represented by 586 of which 492 (84%) were in the senior and executive positions. In 1990, they were under-represented by 218 of which 44 (20%) were in the senior and executive levels. The situation in the Foreign Service is even worse. In 1986, they were under-represented by 430 of which 419 (97%) are in the senior and executive positions. In 1990, they were under-represented by 383, of which 345 (90%) were in the senior and executive grades. In both the Civil and Foreign Services, the White Females have faced a glass ceiling that continues to present a serious constraint to affirmative action program. See Figures 2A and 2B.

c. Black Males: Black Males in the Civil Service are over-represented at the junior and middle management levels but under-represented at the senior and executive levels. This was true in 1986 and continues to be true, to a lesser extent in 1990. In the Foreign Service, they have been under-represented at all grade levels, with very little

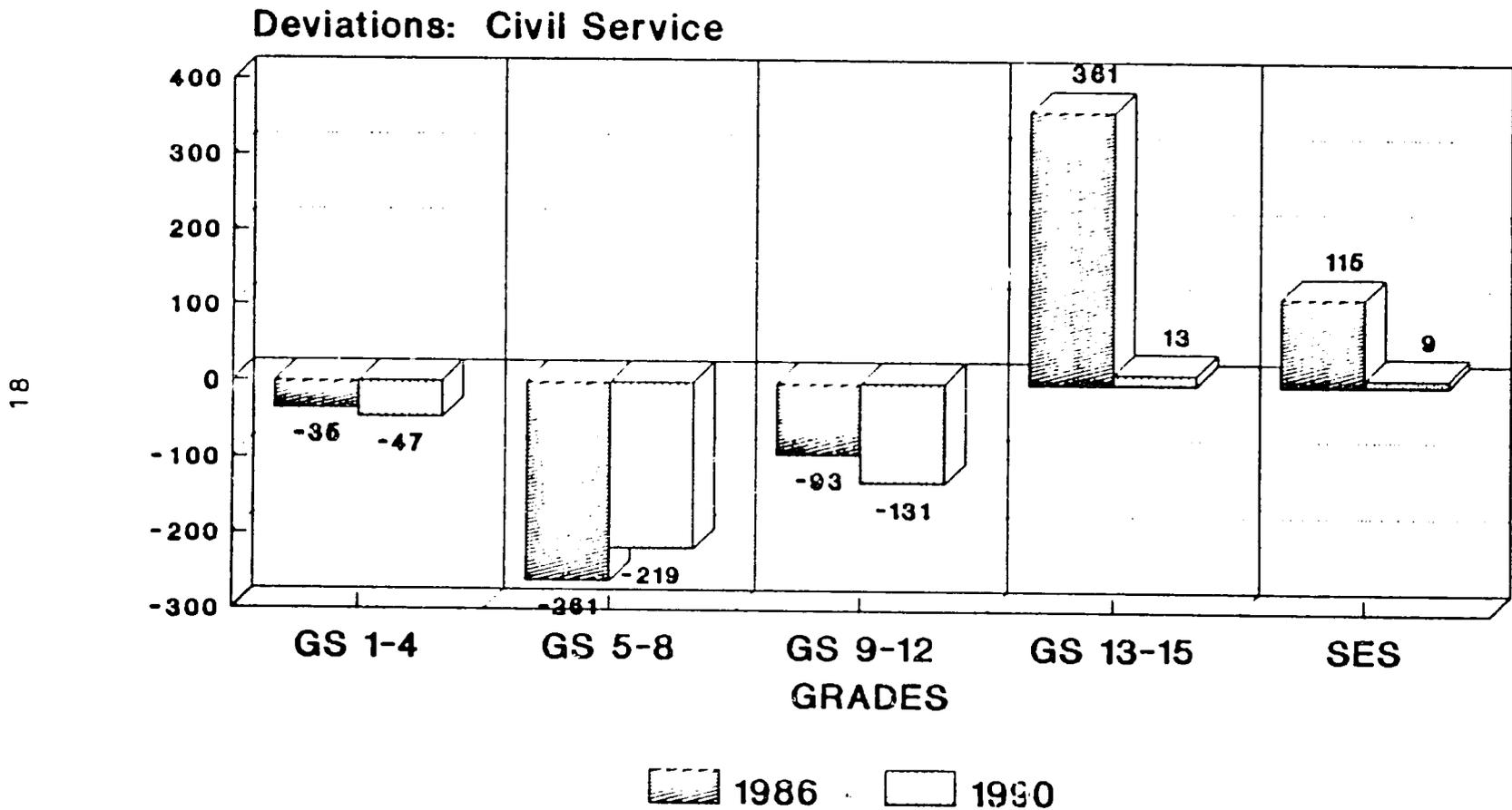
improvement during the last five years. See Figure 3A and 3B.

d. Black Females: Black Females are seriously over-represented in the Civil Service especially at the junior and middle level grade levels. To a limited extent, they have been able to overcome the glass ceiling. However their continued over-representation may raise an issue of reverse discrimination especially White Females are under-represented across all grade levels in the Civil Service. See Figures 4A and 4B.

e. Other Males: In 1986, Other Minority Males, consisting of Hispanics, Asians and Native Americans in the Civil Service have been over-represented at the middle management, senior and executive grade levels. This over-representation has been addressed effectively, to a point that by 1990, they are closer to full representation than any other gender or ethnic group. In the Foreign Service however, they are seriously over-represented at all grade levels, following the pattern of the White Males. Like the White Males, this problem has not been effectively addressed during the last five years. See Figures 5A and 5B.

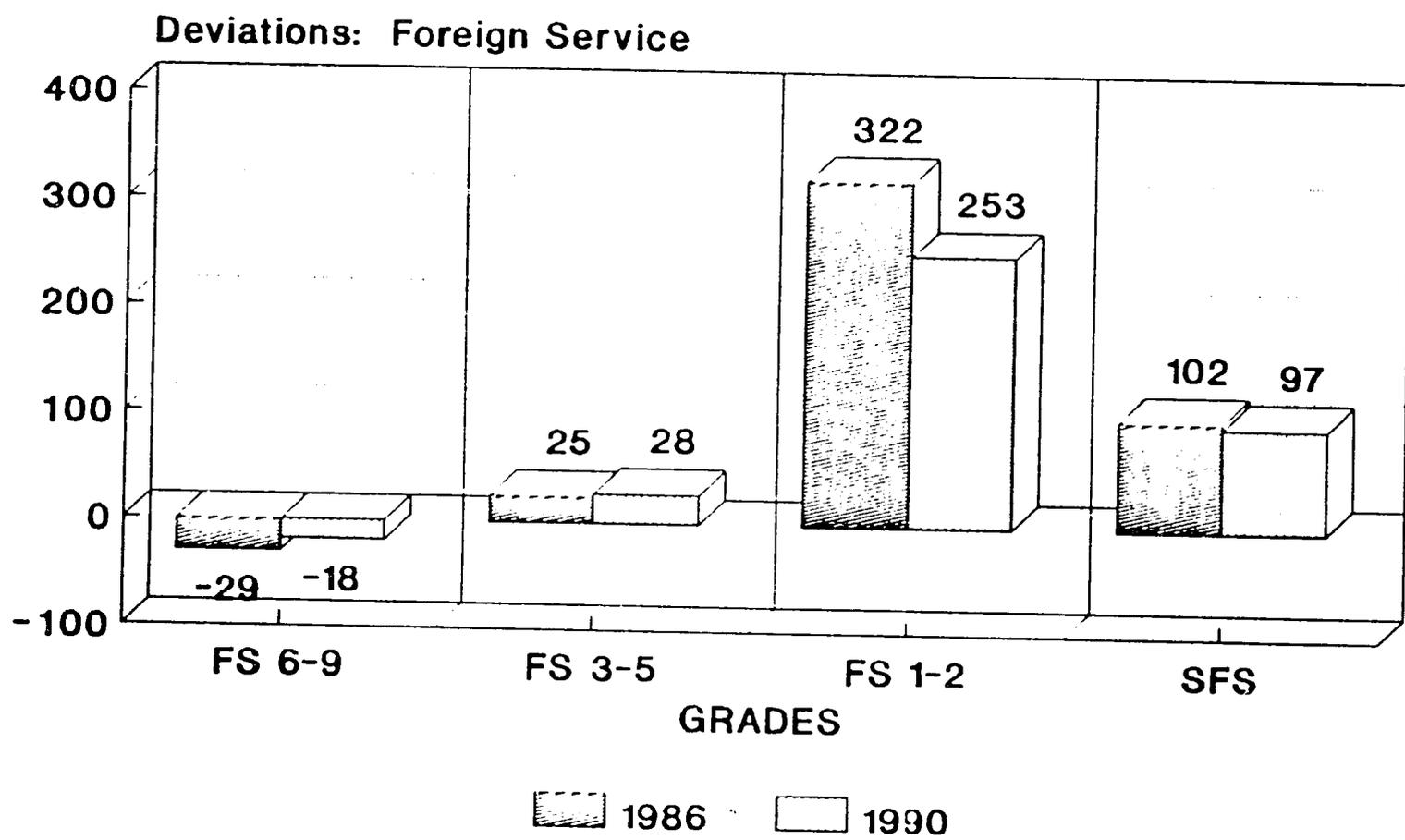
f. Other Females: Other Minority Females in both the Civil Service and Foreign Service are over-represented at the junior and middle management levels but under-represented at the senior and executive grades. Although there has been some limited improvements, this problem has essentially been ignored.

**FIGURE 1A**  
**White Male: Deviations of Actual From**  
**Ideal Workforce**



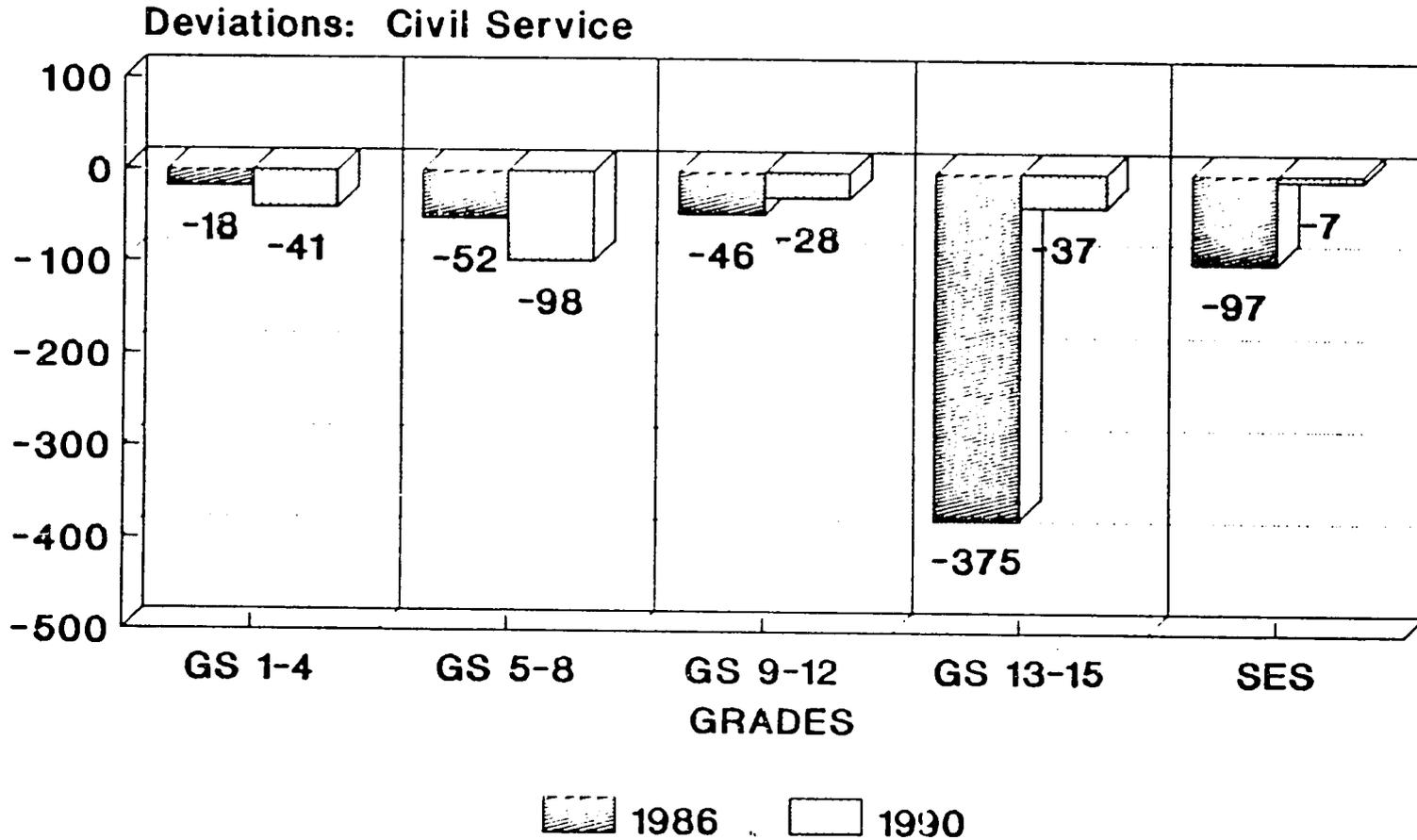
1986:Dev.=87, RI=6, CSQ=562, GCI=51  
 1990:Dev.=-378, RI=-49, CSQ=343, GCI=8

**FIGURE 1B**  
**White Male: Deviations of Actual From**  
**Ideal Workforce**



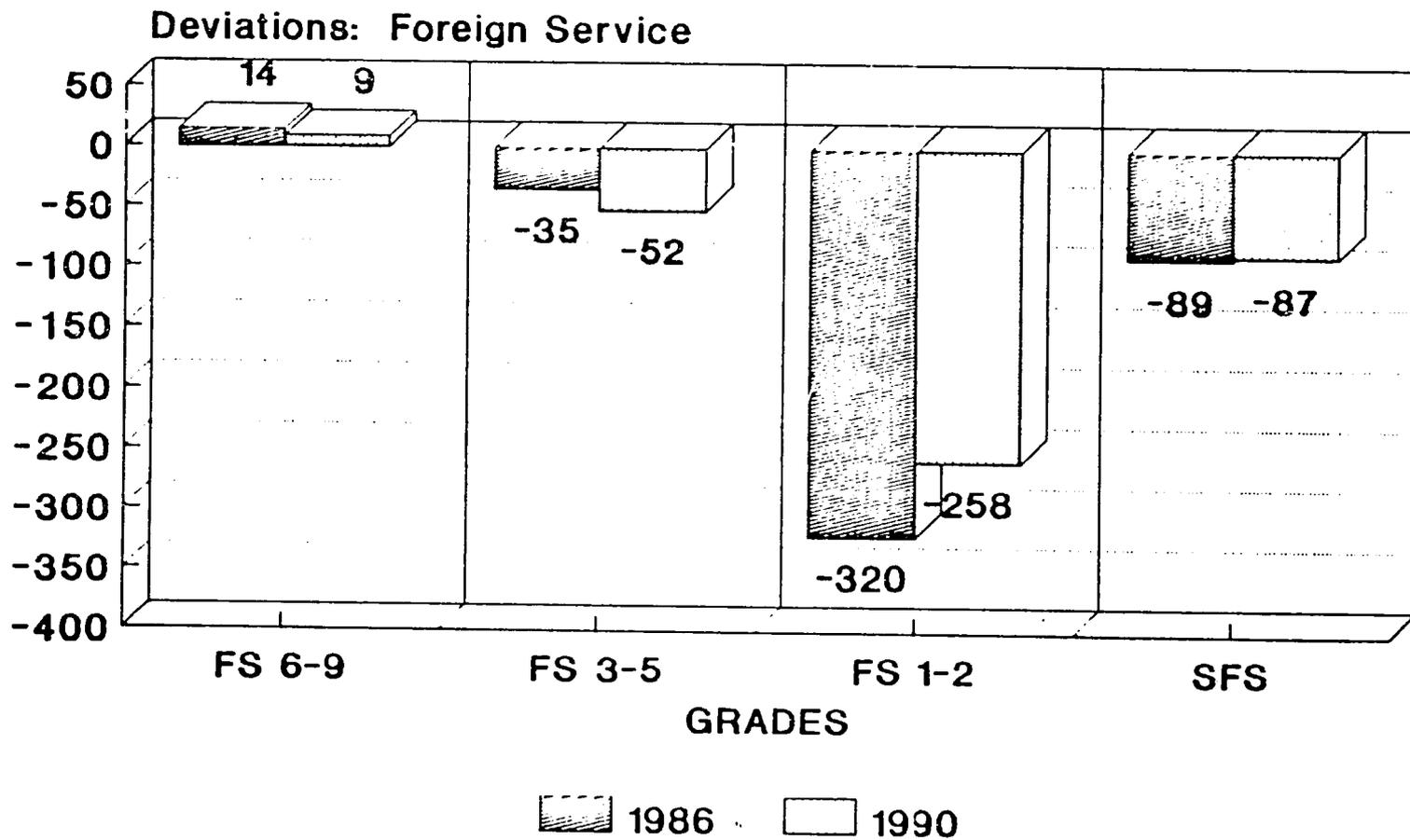
1986:Dev.=420, RI=47, CSQ=306, GCI=64  
 1990:Dev.= 360, RI= 43, CSQ=232, GCI=59

**FIGURE 2A**  
**White Female: Deviations of Actual From**  
**Ideal Workforce**



1986:Dev.=-588, RI=-46, CSQ=332, GCI=-34  
 1990:Dev.=-218, RI=-33, CSQ=264, GCI=-19

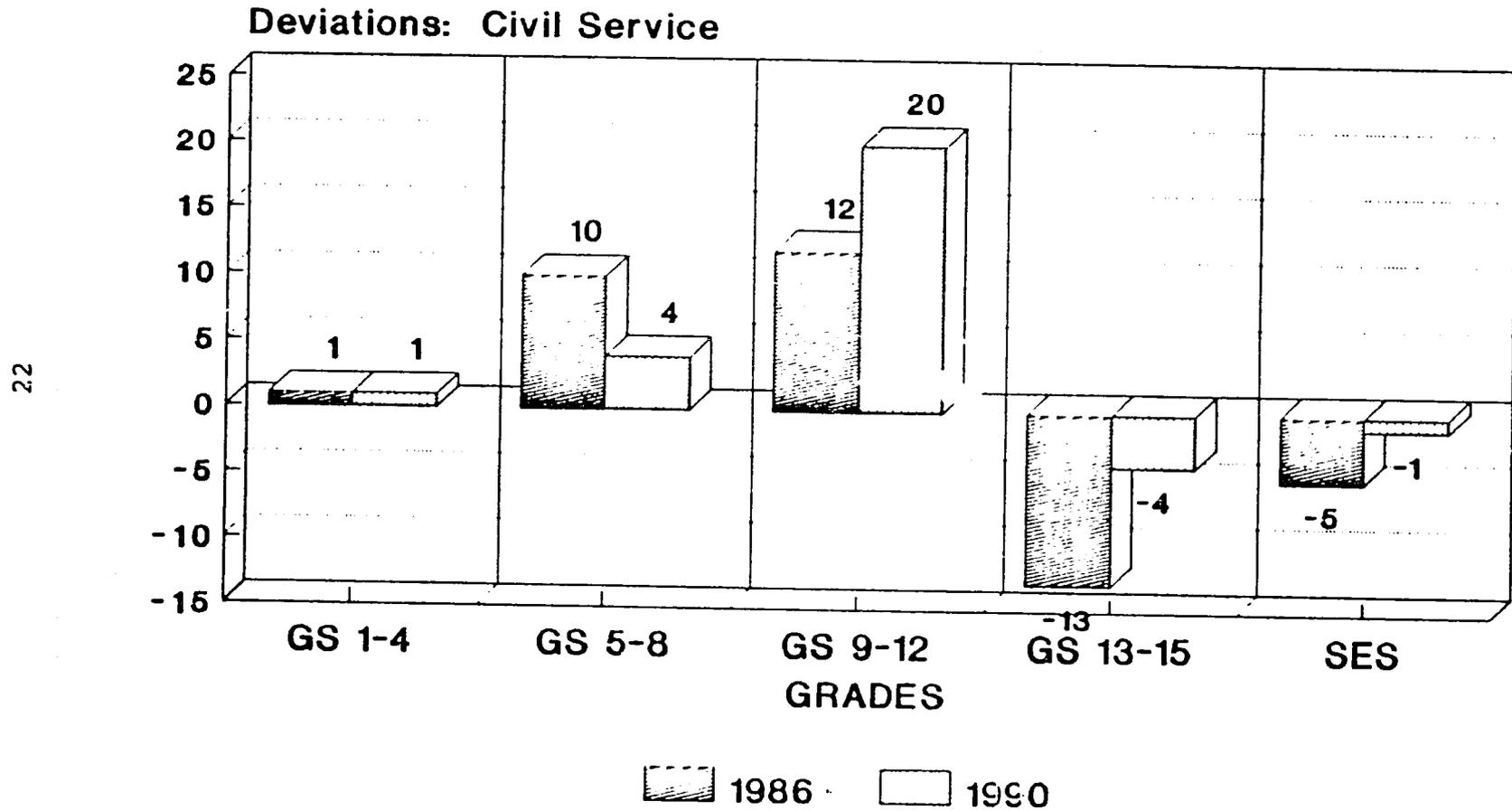
**FIGURE 2B**  
**White Female: Deviations of Actual From**  
**Ideal Workforce**



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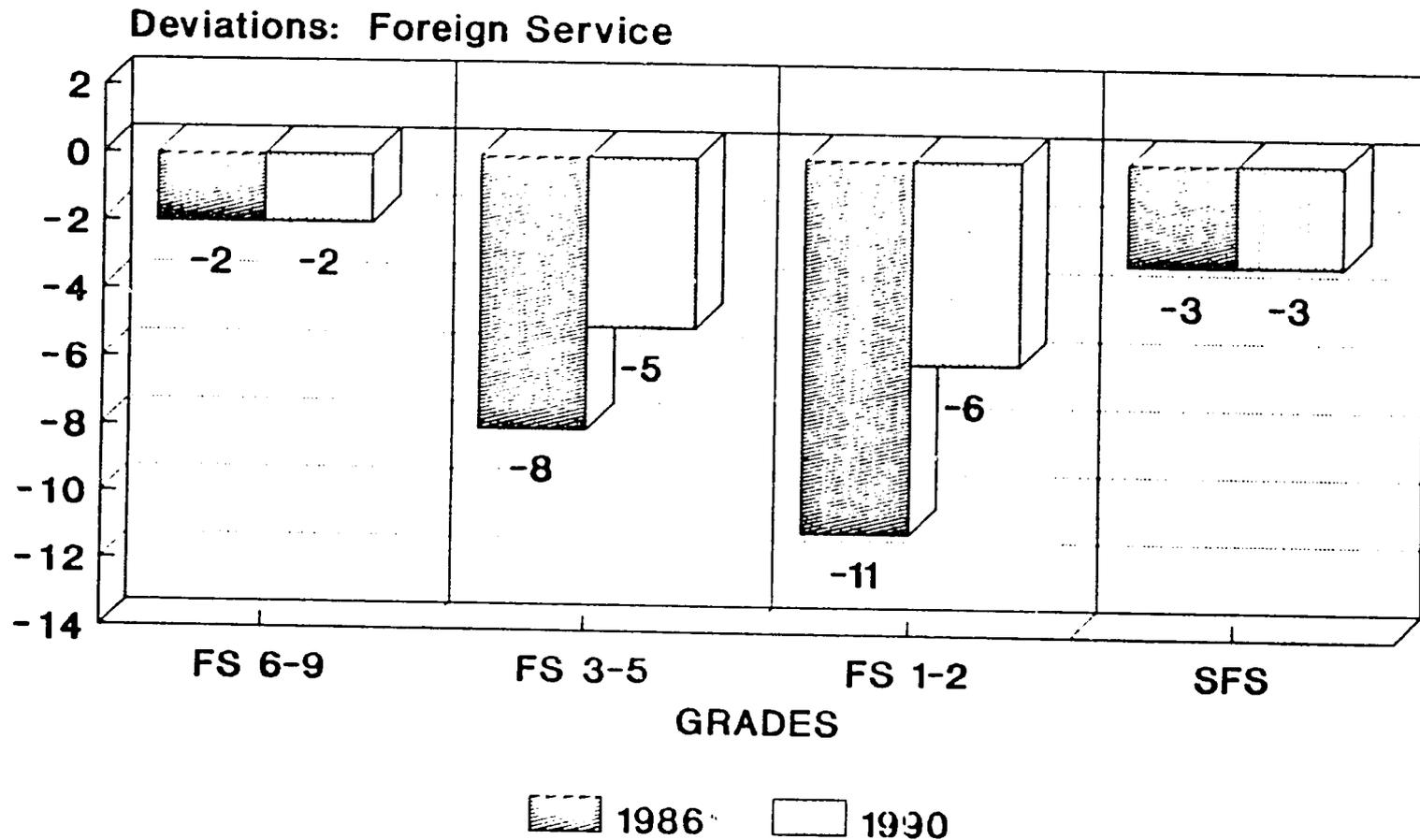
1986:Dev.=-430, RI=-60, CSQ=332, GCI=-77  
 1990:Dev.=-383, RI=-55, CSQ=264, GCI=-70

**FIGURE 3A**  
**Black Male: Deviations of Actual From**  
**Ideal Workforce**



1986: Dev.=5, RI=3, CSQ=10, GCI=-16  
 1990: Dev.=20, RI=21, CSQ=29, GCI=-14

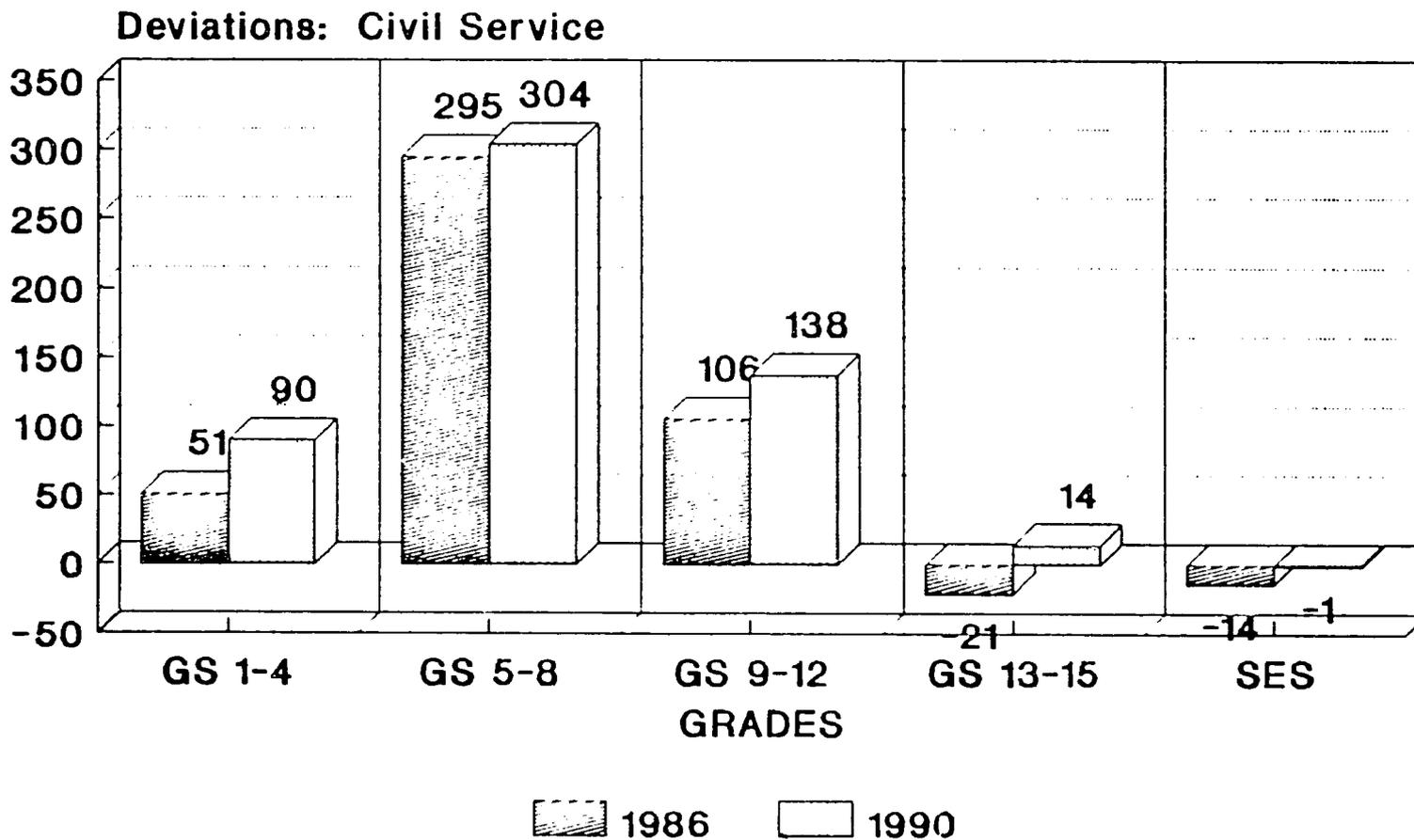
**FIGURE 3B**  
**Black Male: Deviations of Actual From**  
**Ideal Workforce**



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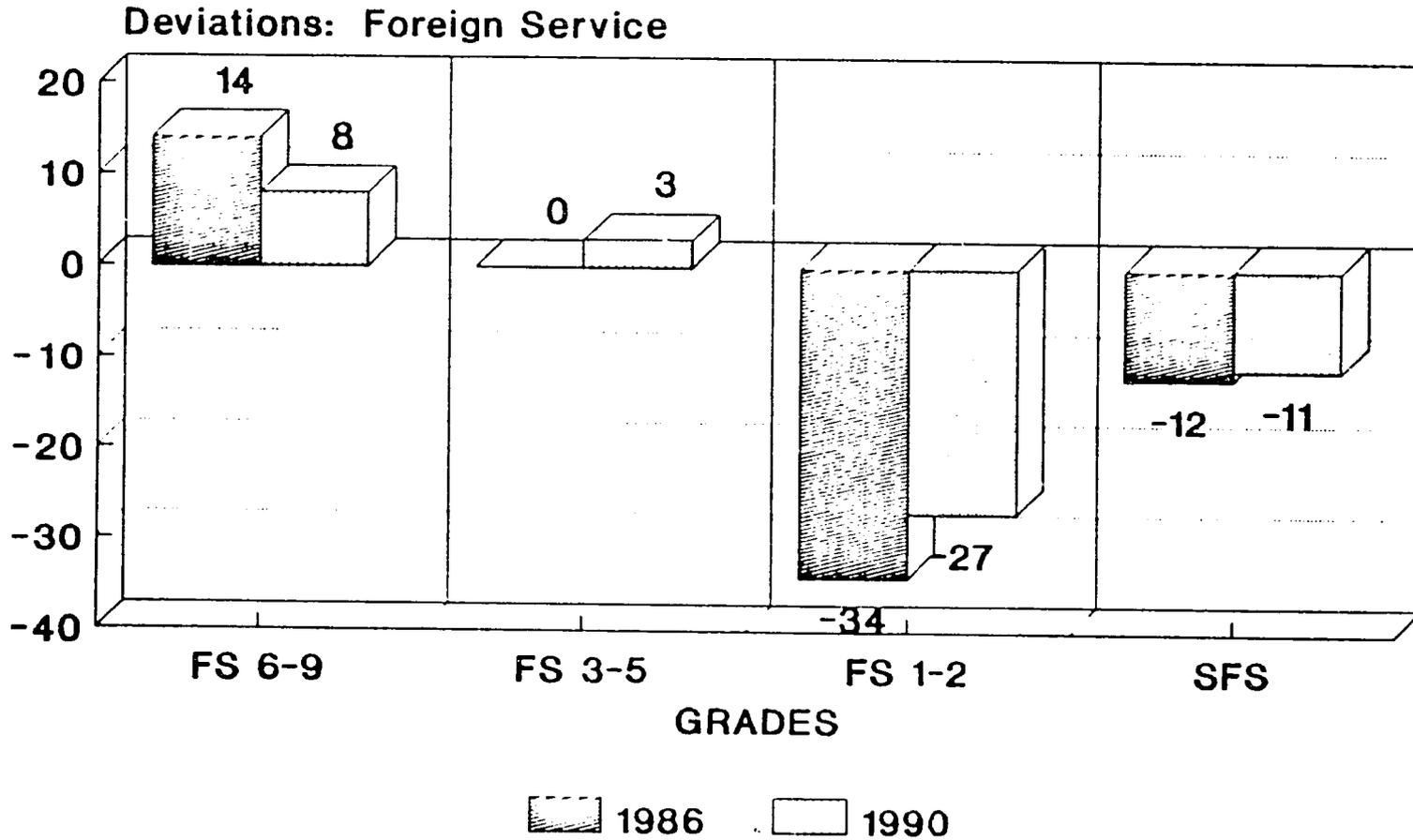
1986:Dev.=-24, RI=-21, CSQ=6, GCI=-17  
 1990:Dev.=-16, RI=-16, CSQ=4, GCI=-8

**FIGURE 4A**  
**Black Female: Deviations of Actual From**  
**Ideal Workforce**



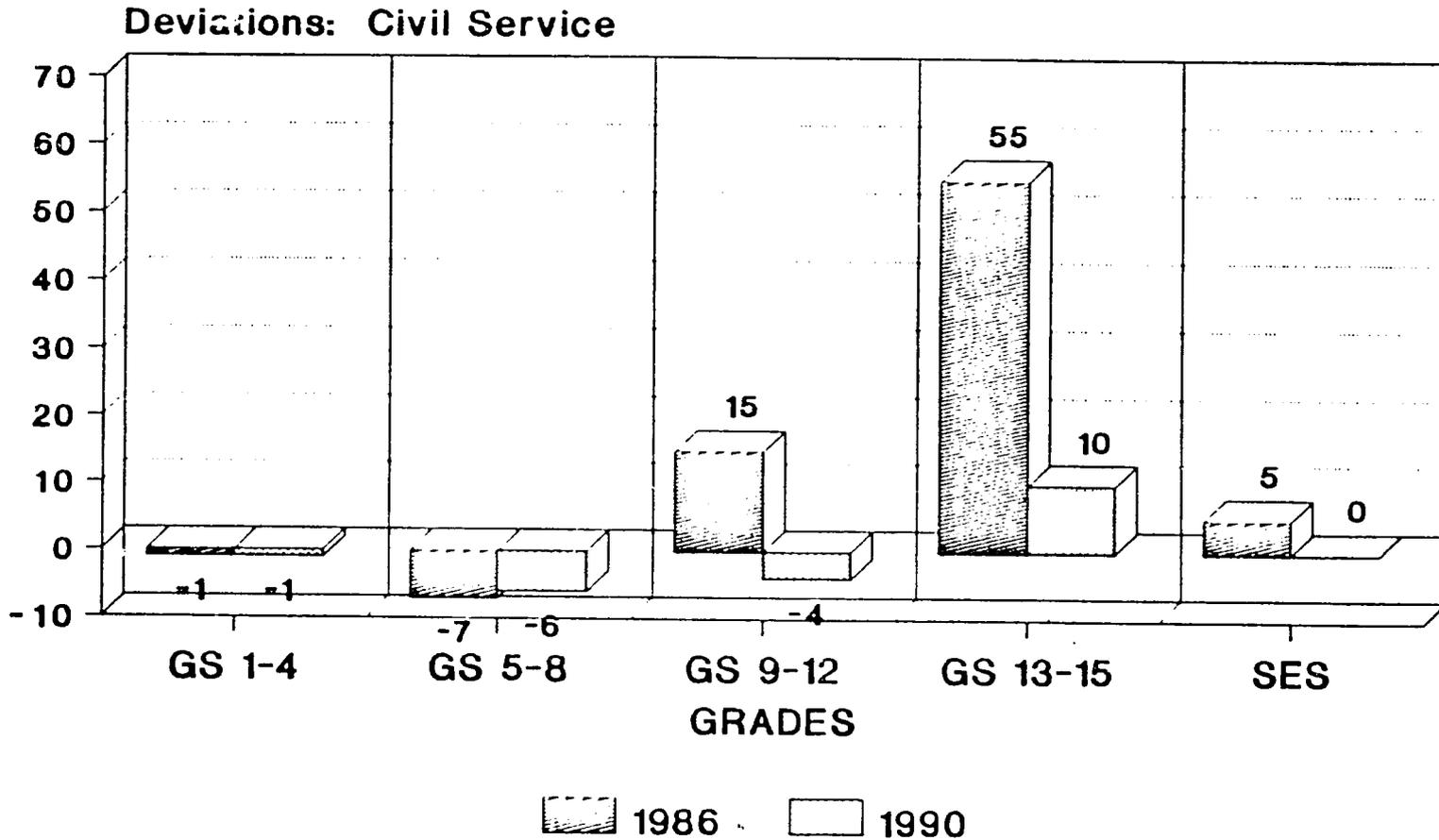
1986:Dev.=417, RI=270, CSQ=4223, GCI=-38  
 1990:Dev.=545, RI=673, CSQ=6006, GCI=43

**FIGURE 4B**  
**Black Female: Deviations of Actual From**  
**Ideal Workforce**



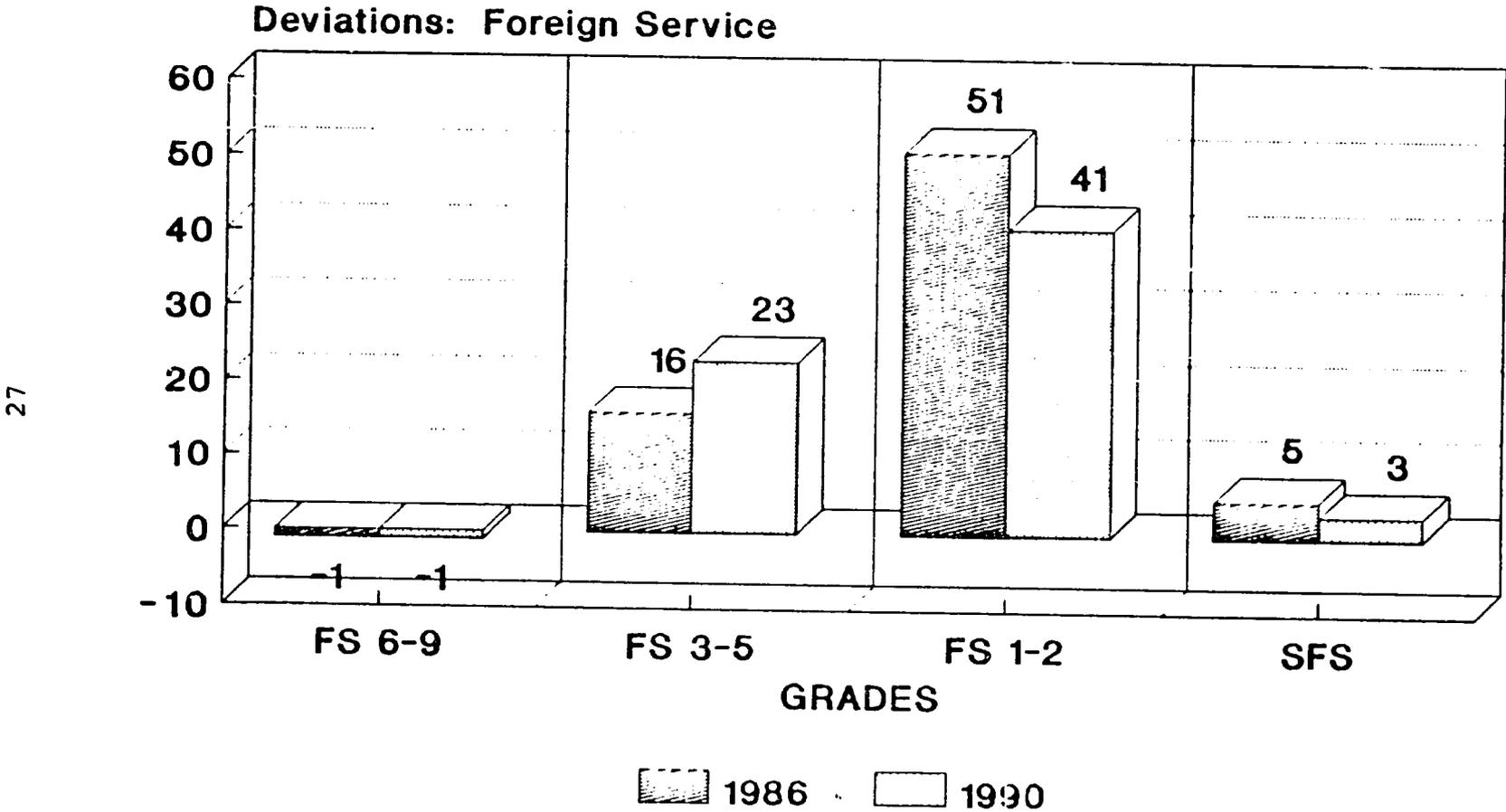
1986: Dev.=-32, RI=-36, CSQ=98, GCI=-70  
 1990: Dev.=-27, RI=-33, CSQ=58, GCI=-40

**FIGURE 5A**  
**Other Male Minorities: Deviations of**  
**Actual From Ideal Workforce**



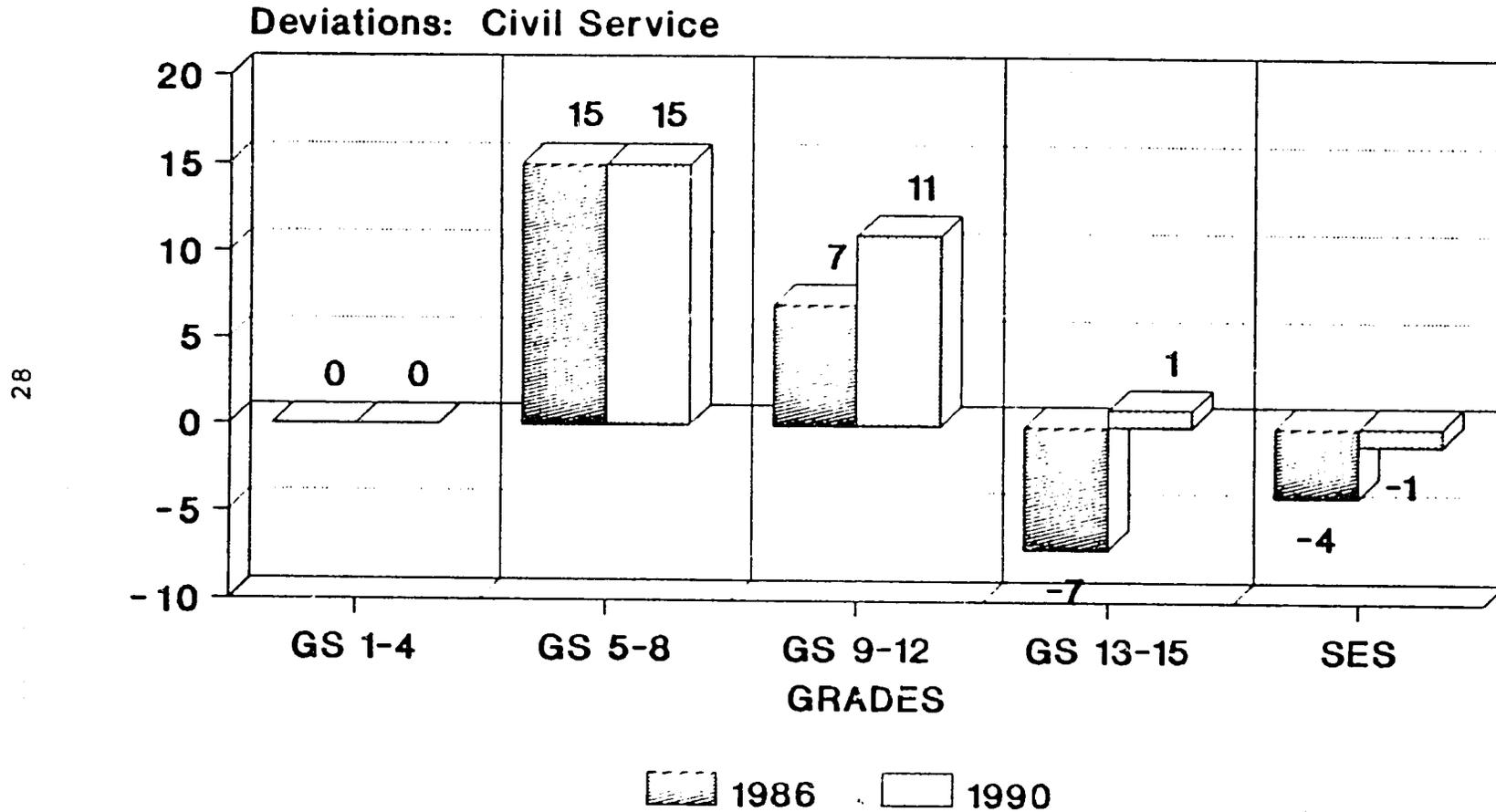
1986:Dev.=67, RI=126, CSQ=147, GCI=194  
 1990:Dev.=-1, RI=-3, CSQ=18, GCI=91

**FIGURE 5B**  
**Other Male Minorities: Deviations of**  
**Actual From Ideal Workforce**



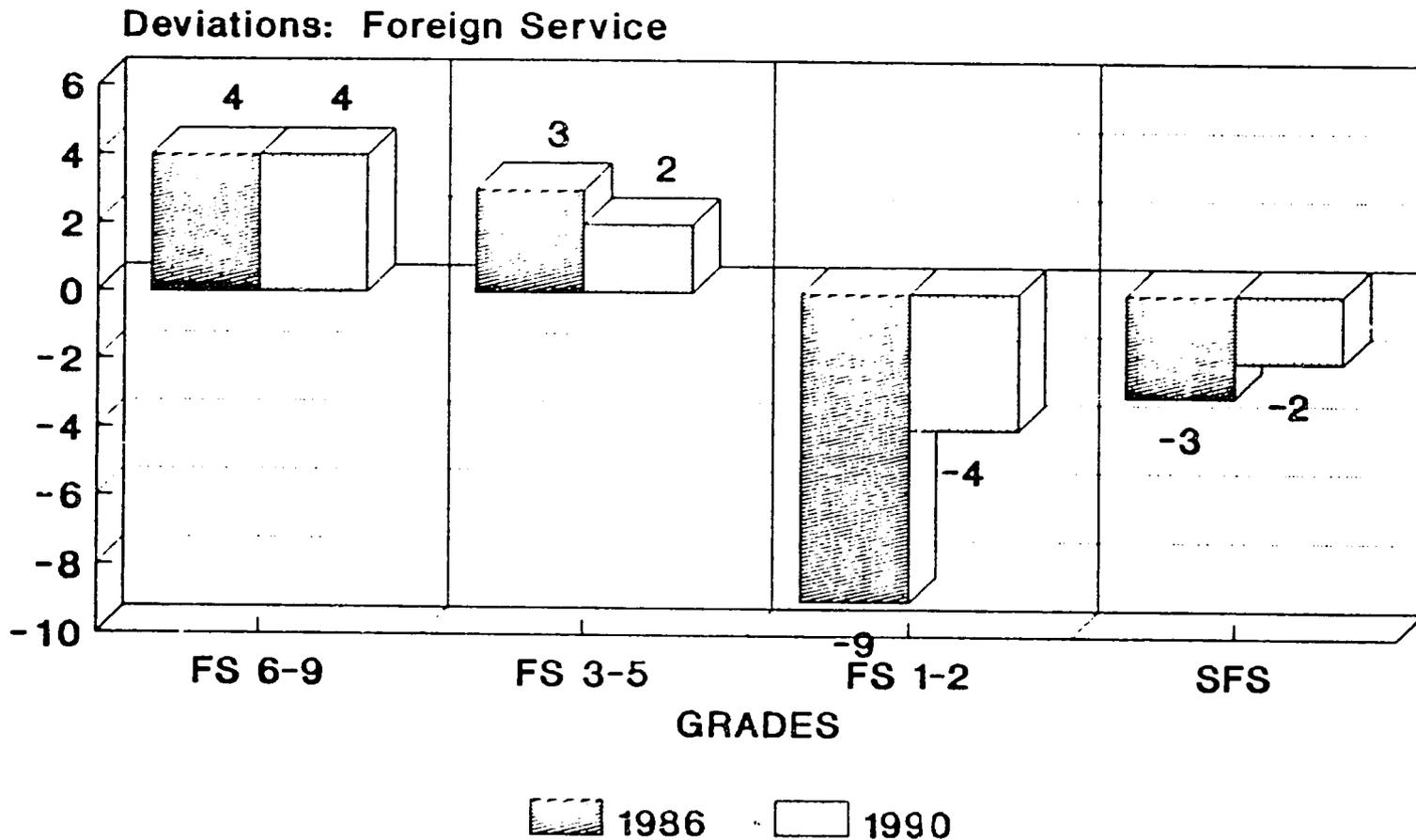
1986: Dev.= 71, RI=245, CSQ=194, GCI=255  
 1990: Dev.= 66, RI=200, CSQ=155, GCI=191

**FIGURE 6A**  
**Other Female Minorities: Deviations of**  
**Actual From Ideal Workforce**



1986:Dev.=11, RI= 22, CSQ=27, GCI=-44  
 1990:Dev.=26, RI= 0, CSQ=19, GCI=-20

**FIGURE 6B**  
**Other Female Minorities: Deviations of**  
**Actual From Ideal Workforce**



1986: Dev.= -5, RI=-22, CSQ=27, GCI=-71  
 1990: Dev.= 0, RI= 0, CSQ=19, GCI=-32

## SUMMARY AND CONCLUSIONS

Based on the changes in the Representational Index, the Glass Ceiling Index and the CSQ values, it can be concluded that the actual workforce of A.I.D. is evolving very slowly towards an ideal workforce characterized by increased representation of women and minorities. It is safe to speculate that the increase in the number of women and minorities and their promotion to higher grade levels is perhaps an evidence of the effectiveness of the affirmative action programs of the Agency for International Development. This success is particularly meaningful because of the continuing staff reduction which constrains management to implement an aggressive program of recruitment, retention and promotion of women and minorities in senior and executive level positions.

The success of the affirmative action program is more pronounced in the Civil Service than in the Foreign Service. For example, programs to reduce the glass ceiling have been more successful in the Civil Service than in the Foreign Service. Progress in addressing under-representation of women and minorities in the Foreign Service have been steady but not quite as dramatic as those in the Civil Service.

These successes should not cloud the magnitude and severity of the remaining problems. Females of all racial groups continue to be under-represented at all grade levels particularly in the senior and executive positions. The Glass Ceiling constraining the advancement of women continue to be a serious concern. Similarly, Black Males are under-represented at all grade levels particularly at the senior and executive grades.

Given the continuing budgetary constraint to limit personnel to the present level or even reduce it as program funding continues to decline, the key to advancement of women and minorities depend on how effectively the Agency can address the problem of over-representation of White Males and Other Minority Males at the senior and executive grade levels.

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TABLE 1:

White Male: Employment Profile by Grade and  
Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	2	37	-35	3	50	-47
GS 5-8	12	273	-261	21	240	-219
GS 9-12	253	346	-93	58	192	-131
GS 13-15	1141	780	361	282	269	13
SES	264	149	115	27	18	9
Total	1672	1585	87	391	769	-378
RI			5.49			-49.15
CSQ			562.46			342.67
GCI			51.29			7.68
<u>B. Foreign Service</u>						
FS 6-9	1	30	-29	2	20	-18
FS 3-5	224	199	25	254	226	28
FS 1-2	852	530	322	719	466	253
SFS	233	131	102	223	126	97
Total	1310	890	420	1198	838	360
RI			47.19			42.96
CSQ			306.22			231.70
GCI			64.14			59.12

TABLE 2:

White Female: Employment Profile by Grade and  
Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	12	30	-18	4	25	-41
GS 5-8	167	219	-52	102	200	-98
GS 9-12	231	277	-46	127	155	-28
GS 13-15	250	625	-375	183	220	-37
SES	22	119	-97	8	15	-7
Total	682	1270	-588	424	639	-218
RI			-46.30			-33.36
CSQ			332.40			264.42
GCI			-33.98			-18.72
<u>B. Foreign Service</u>						
FS 6-9	38	24	14	25	16	9
FS 3-5	124	159	-35	136	188	-52
FS 1-2	106	426	-320	132	385	-258
SFS	15	104	-89	18	105	-87
Total	283	713	-430	311	694	-383
RI			-60.31			-55.18
CSQ			332.40			264.42
GCI			77.17			-70.41

## Annex I

TABLE 3:

Black Male: Employment Profile by Grade and  
Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	7	6	1	8	7	1
GS 5-8	44	34	10	34	30	4
GS 9-12	55	43	12	42	22	20
GS 13-15	84	97	-13	30	34	-4
SES	14	19	-5	1	2	-1
Total	204	199	5	115	95	20
I			2.56			21.05
SQ			9.51			29.34
CI			-15.52			-13.88
<u>B. Foreign Service</u>						
FS 6-9	2	4	-2	0	2	-2
FS 3-5	17	25	-8	20	25	-5
FS 1-2	55	66	-11	52	58	-6
FS	13	16	-3	13	16	-3
Total	87	111	-24	85	101	-16
I			-21.16			-15.84
SQ			5.96			4.18
CI			-17.07			-8.18

## Annex I

TABLE 4:

Black Female: Employment Profile by Grade and  
Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	55	4	51	96	6	90
GS 5-8	322	27	295	329	25	304
GS 9-12	140	34	106	158	20	138
GS 13-15	57	78	-21	42	28	14
SES	1	15	-14	1	2	-1
Total	575	158	417	626	81	545
RI			269.92			672.83
CSQ			4222.59			6006.34
GCI			-37.63			43.33
<u>B. Foreign Service</u>						
FS 6-9	17	3	14	10	2	8
FS 3-5	20	20	0	26	23	3
FS 1-2	19	53	-34	18	45	-27
SFS	1	13	-12	2	13	-11
Total	57	89	-32	56	83	-27
RI			-35.92			-32.53
CSQ			98.22			57.89
GCI			-69.69			-39.58

## Annex I

TABLE 5:

Other Male Minorities: Employment Profile by Grade and Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	0	1	-1	1	2	-1
GS 5-8	2	9	-7	3	9	-6
GS 9-12	27	12	15	3	7	-4
GS 13-15	81	26	55	20	10	10
SES	10	5	5	1	1	0
Total	120	53	67	28	29	-1
RI			126.42			-3.45
CSQ			146.54			17.78
GCI			193.55			90.91
<u>B. Foreign Service</u>						
FS 6-9	0	1	-1	0	1	-1
FS 3-5	22	6	16	32	9	23
FS 1-2	69	18	51	59	18	41
SFS	9	4	5	8	5	3
Total	100	29	71	99	33	66
RI			244.82			200.00
CSQ			194.42			154.97
GCI			254.55			191.30

## Annex I

TABLE 6:

Other Female Minorities: Employment Profile by Grade and  
Related Statistics, 1986 and 1990

<u>Grade</u>	<u>1986</u>			<u>1990</u>		
	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>	<u>Act.</u>	<u>Ideal</u>	<u>Dev.</u>
<u>A. Civil Service</u>						
GS 1-4	1	1	0	2	2	0
GS 5-8	22	7	15	22	7	15
GS 9-12	16	9	7	17	6	11
GS 13-15	14	21	-7	10	9	1
SES	0	4	-4	0	1	-1
Total	53	42	11	51	25	26
RI			-21.73			00.00
CSQ			26.58			18.64
GCI			-44.00			-20.00
<u>B. Foreign Service</u>						
FS 6-9	5	1	4	5	1	4
FS 3-5	8	5	3	9	7	2
FS 1-2	5	14	-9	11	15	-4
SFS	0	3	-3	2	4	-2
Total	18	23	-5	27	27	0
RI			-21.73			0.00
CSQ			26.58			18.64
GCI			-70.59			-31.58

## Annex II

### Statistical Procedures

The procedure used in this study involves three steps, namely, (1) estimating the ideal workforce distribution with the use of a discrete probability density function constructed from the gender ratio and the racial composition of the national civilian labor force and the grade distribution of the agency workforce; (2) estimating the difference of the actual from the ideal distribution; and (3) estimating the representation index (RI), the Glass Ceiling Index (GCI) and the Chi square values based on the differences obtained in (2). These procedures are shown mathematically as follows:

1. Estimating the ideal workforce level is shown in Eq. 1.

$$(1) W'_{hij} = W_t (R_h \cdot S_i \cdot G_j), \text{ where}$$

$W'_{hij}$  is the ideal workforce for the  $h^{\text{th}}$  race,  $i^{\text{th}}$  gender and the  $j^{\text{th}}$  grade,

$W_t$  is the total agency workforce,

$R_h$  race or ethnic distribution,  $h = 1 \dots 3$

$S_i$  gender distribution,  $i = 1 \dots 2$

$G_j$  rank distribution,  $j = 1 \dots 5$ .

6. Estimating the Glass Ceiling Index as shown in Eq. (6)

$$(6) \quad GCI = \frac{\sum_{j=3}^5 D_{hi}}{\sum_{j=3}^5 W'_{hi}}$$

7. Estimating the Chi Square Value as shown in Eq. 7.

$$(7) \quad CSQ = \frac{\sum_{i=1}^5 D_{hi}^2}{\sum_{j=1}^5 W'_{hi}}$$